APPENDIX D

USFWS BIOLOGICAL OPINION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

IN REPLY REFER TO:

FEB 19 1999

FEB 24 1999

Colonel Joe R. Miller
District Engineer
U.S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, Florida 32232-0019

RE: Log Number 4-1-95-310R

Dear Colonel Miller:

Enclosed is the final biological opinion for the Modified Water Deliveries to Everglades National Park project, Experimental Water Deliveries Program, and the C-111 Project, proposed by the Corps of Engineers in South Florida. A separate letter addressing your specific comments, dated February 5, 1999, on our final draft biological opinion, dated January 4, 1999, will be provided early next week.

The reasonable and prudent alternative provided in the biological opinion is a tiered process to implement over a four year period. This allows the Interim Measures Team to work together to review proposed actions as well as other options without jeopardizing the Cape Sable seaside sparrow. If the Interim Measures Team determines that other actions would be more appropriate for the protection of the sparrow and fulfillment of the project objectives, the biological opinion can be modified through reinitation of formal consultation.

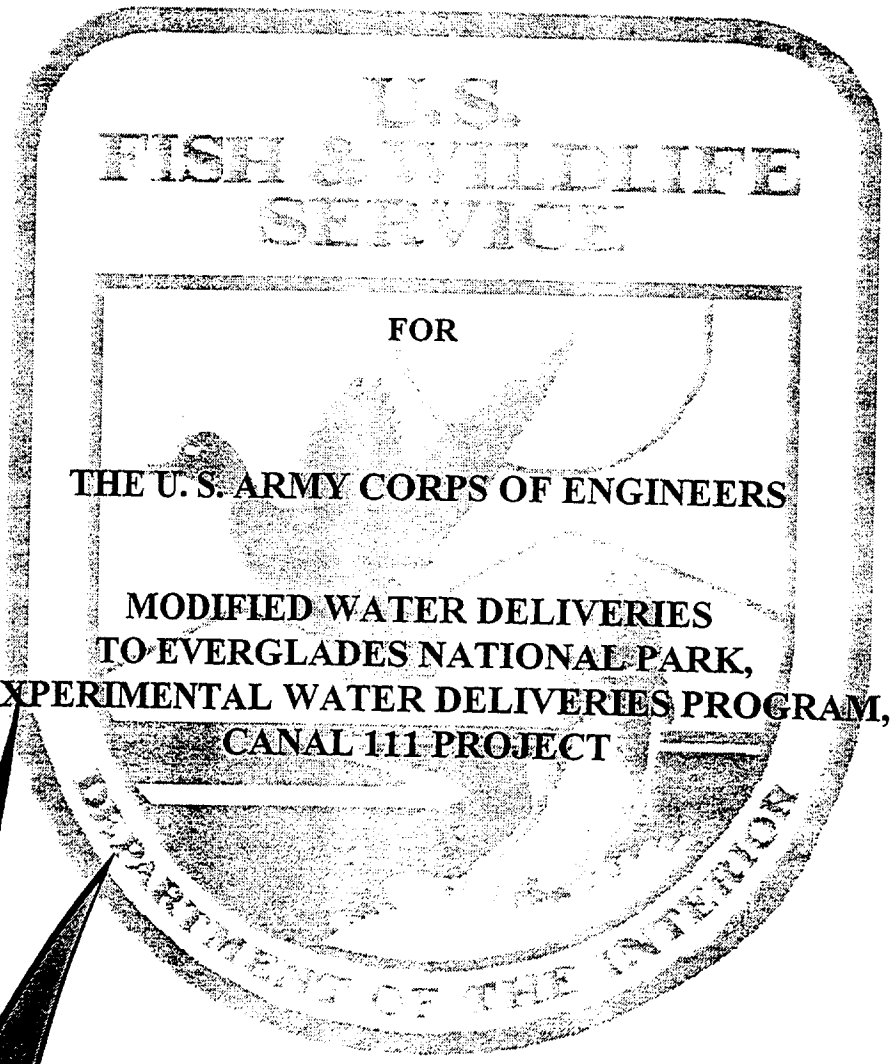
Your cooperation in completion of this biological opinion was greatly appreciated. If you have any questions regarding this issue, please contact Steve Forsythe, my Florida State Supervisor, at (561) 778-7671.

Sincerely yours,

H Dale Hall

for Sam D. Hamilton
Regional Director

U. S. FISH & WILDLIFE SERVICE
FINAL BIOLOGICAL OPINION



FOR

THE U. S. ARMY CORPS OF ENGINEERS

MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK, EXPERIMENTAL WATER DELIVERIES PROGRAM, CANAL 111 PROJECT

FEBRUARY 19, 1999

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

IN REPLY REFER TO:

FEB 19 1999

Colonel Joe R. Miller
District Engineer
U.S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, Florida 32232-0019

Dear Colonel Miller:

This document transmits the Fish and Wildlife Service's biological opinion based on our review of the proposal by the U.S. Army Corps of Engineers (Corps) for the Modified Water Deliveries to Everglades National Park project, Experimental Water Deliveries Program, and the C-111 Project, all located in South Florida, and their effects on federally listed threatened and endangered species in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). By letter dated November 4, 1997 the Corps agreed to reinitiate consultation on the **Modified Water Deliveries** project and the **Experimental Program.**

This biological opinion is based on information provided by the Army Corps of Engineers (Corps), Everglades National Park, Florida Game and Fresh Water Fish Commission, South Florida Water Management District, and project information available in our files. It also includes data on the biology and ecology of threatened and endangered species in the action area, previous biological opinions prepared for similar actions in the action area, the Technical Agency Draft of Volume I of the Multi-Species Recovery Plan for the Threatened and Endangered Species of South Florida and other published and unpublished sources of information. A complete administrative record of this consultation is on file in the Service's South Florida Restoration Projects Office in Vero Beach, Florida.

Executive Summary

This biological opinion covers three interrelated Everglades restoration projects. The **Modified Water Deliveries** project and **C-111 Project** are scheduled to be implemented over the next decade. The **Experimental Program**, which has been ongoing since 1983, is implemented through a series of test iterations. The **Modified Water Deliveries** and **C-111 Project** consist of structural changes to water management facilities in South Florida designed to restore a more natural flow of water through the Everglades. The **Experimental Program** consists primarily of changes in the operation of current water management facilities designed to restore a more natural flow of water through the Everglades.

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The effects these three projects are likely to have on endangered species are analyzed in detail. Results of these analyses are summarized in the table below.

Summary of Effects and/or Adverse Modification of Critical Habitat of The Modified Water Deliveries Project to Everglades National Park, Experimental Program of Water Deliveries to Everglades National Park, And C-111 Project, as proposed, on Federally Listed Species (E - endangered, T - threatened).

SPECIES / PROJECTS	EXPERIMENTAL PROGRAM	MODIFIED WATER DELIVERIES	C-111 PROJECT
Cape Sable Seaside Sparrow (E)	Hydrologic: jeopardy and adverse modification of critical habitat Construction: adverse effects, no adverse modification of critical habitat Reasonable and Prudent Alternatives: a single reasonable and prudent alternative is identified Incidental Take: incidental take is anticipated; reasonable and prudent measures are identified	Hydrologic: NONE Construction: NONE	Hydrologic: NONE Construction: adverse effects, no adverse modification of critical habitat Incidental Take: incidental take is anticipated; no reasonable and prudent measures are necessary due to Construction Monitoring Conditions
American Crocodile (E)	Hydrologic: NONE Construction: NONE	Hydrologic: adverse effects, no adverse modification of critical habitat Construction: NONE Incidental Take: incidental take is anticipated; reasonable and prudent measures are identified	Hydrologic: NONE Construction: NONE

Wood Stork (E) (critical habitat has not been designated)	Hydrologic: adverse effects Construction: NONE Incidental Take: incidental take is anticipated; reasonable and prudent measures are identified	Hydrologic: adverse effects Construction: NONE Incidental Take: incidental take is anticipated; reasonable and prudent measures are identified	Hydrologic: NONE Construction: NONE
Snail Kite (E)	Hydrologic: adverse effects, no adverse modification of critical habitat Construction: NONE Incidental Take: incidental take is anticipated but the reasonable and prudent alternative will eliminate the incidental take	Hydrologic: adverse effects, no adverse modification of critical habitat Construction: NONE Incidental Take: incidental take is anticipated; reasonable and prudent measures are identified	Hydrologic: NONE Construction: NONE

A reasonable and prudent alternative to the **Experimental Program** that will avoid jeopardizing the Cape Sable seaside sparrow is presented. This alternative requires that: (1) By March 1, 1999, a minimum amount of sparrow habitat be protected from unusually high or low water levels; (2) By May 1, 1999, a fire management strategy be initiated; (3) Between March 1, 2000, and 2003, incrementally increase protections from unusually high or low water levels; (4) Annual reports must be submitted to the Service detailing progress implementing the RPA. Reasonable and prudent measures and terms and conditions designed to minimize incidental take of listed species, and conservation recommendations designed to benefit listed species, are also presented.

Consultation History

The Central and South Florida Project for Flood Control and Other Purposes (C&SF Project) utilizes levees, water storage areas, canals, gravity-flow water control structures, and large-capacity pump stations for managing water in central and southern Florida (Figure 1). In November 1983, as a result of adverse environmental effects within Everglades National Park (ENP) related to high rainfall and water management practices in South Florida, Congress enacted legislation that authorized the **Experimental Program**, allowing the U.S. Army Corps of Engineers (Corps), with the concurrence of the National Park Service (NPS) and South Florida Water Management District (SFWMD), to deviate from the existing minimum water delivery schedule established for ENP by Congress in 1970. The **Experimental Program**, which is being implemented through a series of test iterations, is attempting to improve the location, timing, and volume of water deliveries to ENP. The first five test iterations involved the operation of structures that delivered water from Water Conservation Area 3 (WCA 3) to both western and northeastern Shark River Slough (Figure 2). Our files contain a June 5, 1985, record of concurrence with the Corps' no effect determination for Test Iterations 1-5.

On September 20, 1988, the U.S. Fish and Wildlife Service (Service) provided the Corps with the Fish and Wildlife Coordination Act (FWCA) report on the **C-111 Project**. The **C-111 Project** entails flood control and ecosystem restoration in the C-111 basin of the C&SF Project, including Taylor Slough within ENP, and extending north in the area of Levee 31N (L-31N) to water control Structure 331 (S-331) (Figure 2). The proposed **C-111 Project** plan only included structural features, since operational plans were still under development. The Service raised concerns in the FWCA report regarding potential adverse effects to American crocodile (*Crocodylus acutus*) nesting and adverse modification of Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) habitat. Our files contain no additional consultation records regarding this action.

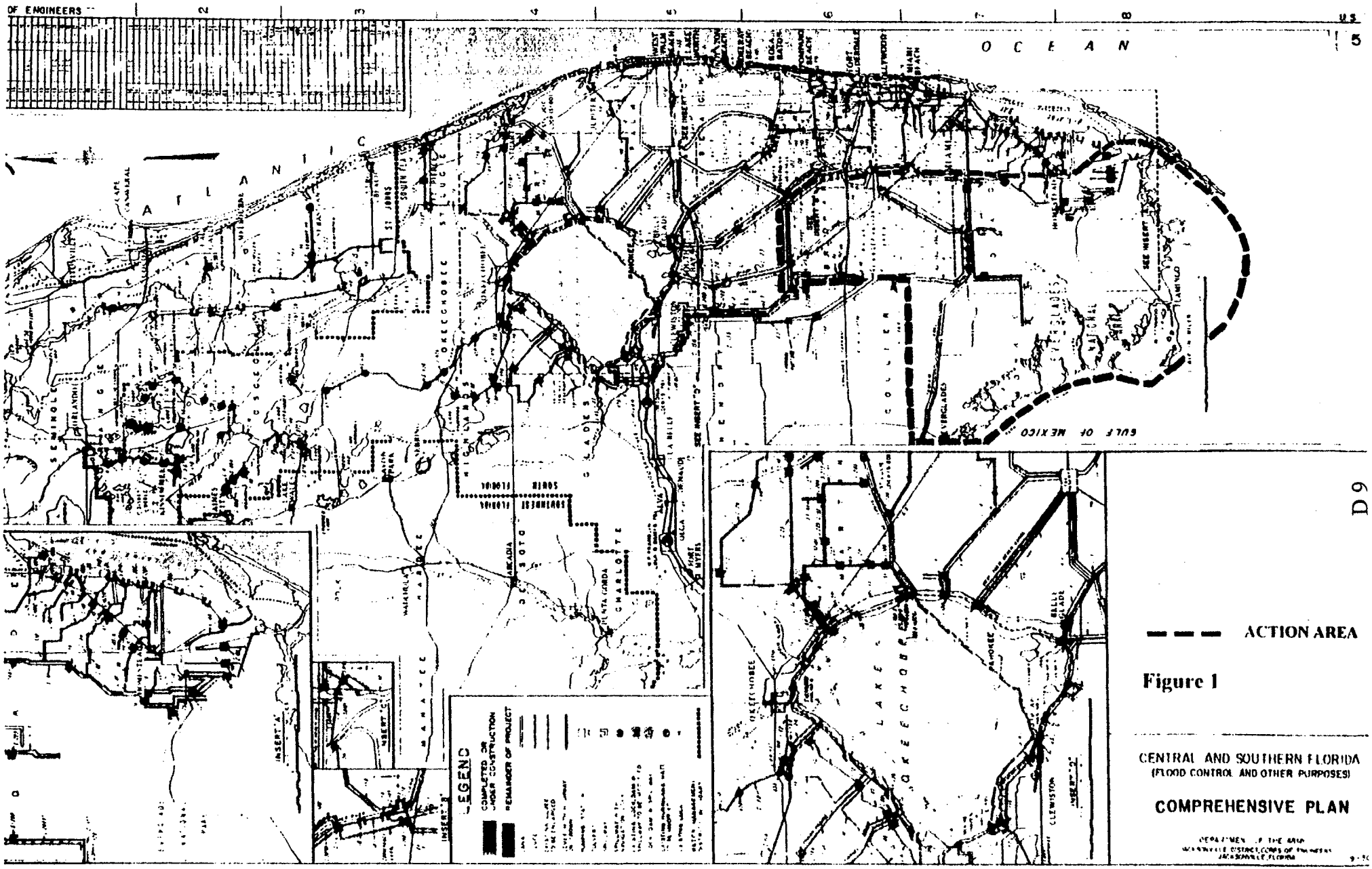

Figure 1

CENTRAL AND SOUTHERN FLORIDA
(FLOOD CONTROL AND OTHER PURPOSES)

COMPREHENSIVE PLAN

DEPARTMENT OF THE ARMY
JACKSONVILLE, FLORIDA

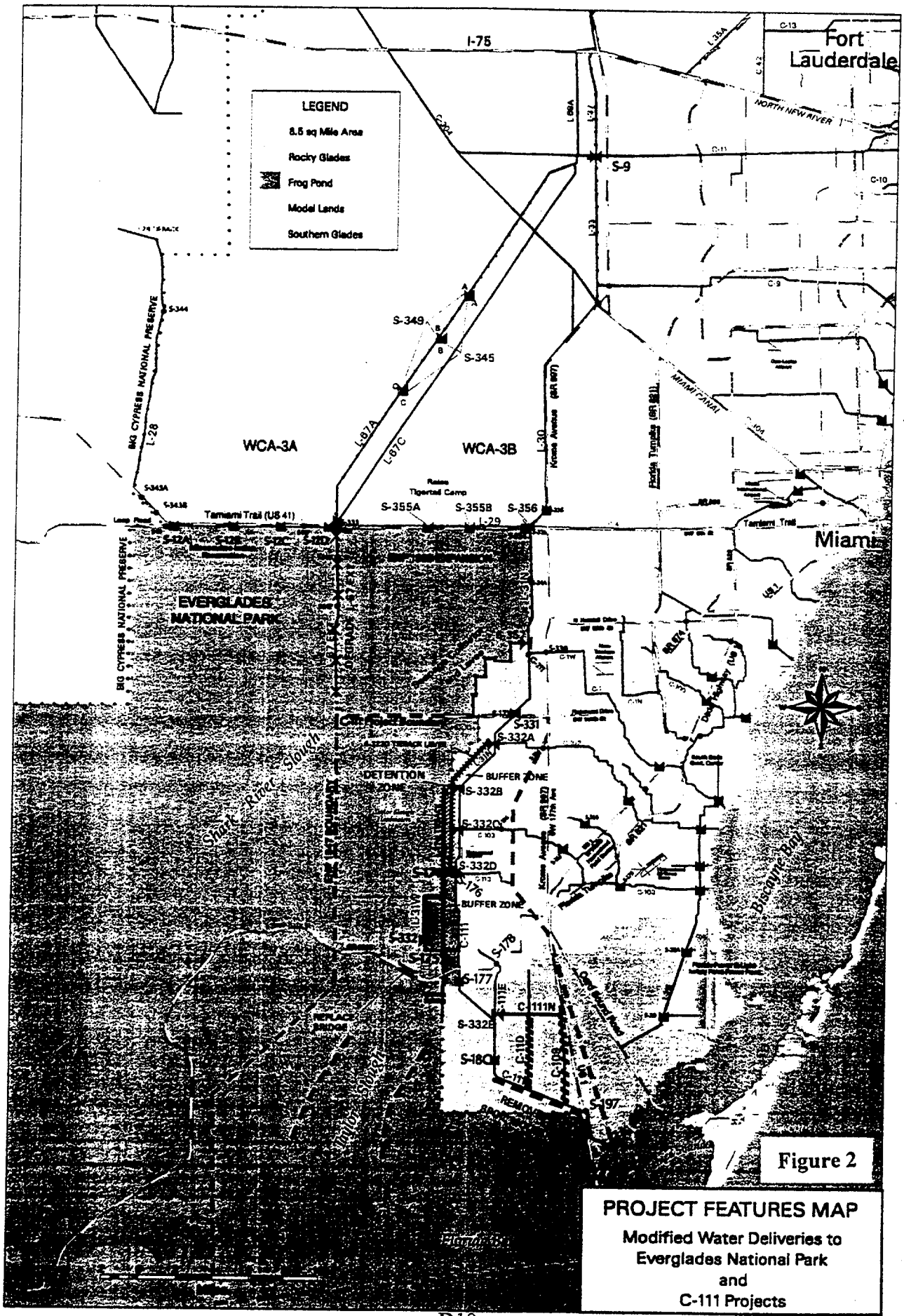

Figure 2

PROJECT FEATURES MAP

Modified Water Deliveries to Everglades National Park and C-111 Projects

In 1989 Congress passed legislation which authorized the Corps to construct modifications to improve water deliveries into ENP through Shark River Slough. These modifications were to be based upon the findings of the **Experimental Program** and a General Design Memorandum (GDM) under preparation by the Corps entitled, "Modified Water Deliveries to Everglades National Park" (**Modified Water Deliveries**). The **Modified Water Deliveries** project addresses water deliveries to ENP through Shark River Slough, and operationally extends east to include the L-31N Canal area north of S-331 (Figure 2). The GDM addressed both structural and operational plans for four different alternatives. On February 13, 1990, the Service issued a biological opinion on **Modified Water Deliveries** which evaluated three action alternatives: (1) Modified Minimum Water Deliveries, (2) Modified Rainfall-Driven Water Deliveries, (3) Basic Rain-Driven Water Deliveries. The biological opinion concluded that implementation of either the Modified Minimum Water Deliveries or Modified Rainfall-Driven Water Deliveries were not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. However, implementation of the Basic Rain-Driven Water Deliveries alternative was found to jeopardize the continued existence of the snail kite (*Rostrhamus sociabilis plumbeus*) and adversely modify its critical habitat. The biological opinion included the following reasonable and prudent alternatives to preclude jeopardy: (a) implement the Modified Minimum Water Deliveries alternative or (b) implement the Modified Rainfall-Driven Water Deliveries alternative with monitoring related to the anticipated incidental take of the snail kite. The Corps decided to implement the Modified Rainfall-Driven alternative.

Test 6 of the **Experimental Program** began in July 1993, and involved the use of two additional 100 cubic feet per second (cfs) portable pumps at pump station Structure 332 (S-332) and the potential to increase discharges into Taylor Slough up to a total of 500 cfs as water was available and needed (Figure 2). Previously, the pump operation had been restricted to the months of June through October (wet season), however, the Test 6 operation proposal sought to pump at any time of the year when water is available in C-111 West at S-332. Water delivery operations for Shark River Slough were carried over into Test 6 unchanged from the previous test iteration. The second component of the proposal was the raising of operational canal levels in the C-111 system. A biological opinion was issued by the Service on June 3, 1994 (mistakenly dated 1993), which concluded that implementation of Test 6 of the **Experimental Program** was not likely to jeopardize the continued existence of the Cape Sable seaside sparrow, but recommended that pumping at S-332 during January through May (sparrow nesting season) be limited to 200 cfs to prevent nest flooding.

On May 31, 1994, the Service provided an interim FWCA report to the Corps on the December 9, 1993, revised **C-111 Project**. The Service concurred with the Corps's determination of "no effect" for the snail kite, wood stork (*Mycteria americana*), bald eagle (*Haliaeetus leucocephalus*), eastern Indigo snake (*Drymarchon corais couperi*), American crocodile and Florida panther (*Felis concolor coryi*). However, the Service was unable to evaluate the effects on the Cape Sable seaside sparrow beyond construction features and, therefore, could not concur with a "no effect" determination until operational plans where developed and reviewed.

In a letter dated March 2, 1995, the Corps requested informal consultation and sought concurrence with their determination of effects to listed species from implementation of proposed Test 7 of the **Experimental Program**. The proposal was to implement water delivery to ENP at Taylor Slough via the L-31W Canal based on a formula derived from a rainfall/canal stage relationship developed by ENP for water deliveries to Taylor Slough (Figure 2). Under this proposal, the Corps indicated they would need the flexibility to deliver whatever volumes of water the formula called for including the potential to exceed the 200 cfs capacity that was consulted on for Test Iteration 6. The Corps's evaluation concluded that implementation of the Test 7 proposal would have "no effect" on federally listed species, including the Cape Sable seaside sparrow, because the 1994 sparrow survey had indicated that the species was no longer present in Taylor Slough.

In a letter dated September 22, 1995, the Service responded to the Corps's Preliminary Environmental Assessment and Finding of No Significant Impact for Test Iteration 7 and accompanying determination that implementation of their preferred alternative "may effect" designated critical habitat for the Cape Sable seaside sparrow. The Service concluded that Test 7 was not likely to adversely affect the Florida panther, American crocodile, snail kite and eastern indigo snake, but that implementation was likely to adversely affect the Cape Sable seaside sparrow, its designated critical habitat, and the wood stork.

On October 27, 1995, the Service issued its biological opinion which concluded that implementation of Test 7 was likely to jeopardize the continued existence of the Cape Sable seaside sparrow, but would not adversely modify its critical habitat. In addition, the biological opinion concluded that implementation of Test 7 was not likely to jeopardize the continued existence of the wood stork. As a reasonable and prudent alternative to avoid jeopardy to the sparrow, the Service instructed the Corps to develop a Remedial Action Plan.

By letter dated October 17, 1997, the Service requested the Corps to reinitiate consultation on the **Modified Water Deliveries** project, **Experimental Program**, and the **C-111 Project**. The request to reinitiate consultation on the **Modified Water Deliveries** project was recommended because new information indicated that the previous "no effect" determination on the **Modified Water Deliveries** project for the Cape Sable seaside sparrow was no longer valid and there were deficiencies in the existing biological opinion relating to the potential unauthorized incidental taking of wood storks. The reinitiation request for the **Experimental Program** resulted from the scope of the 1995 biological opinion for Test 7, which only addressed operational plans for Phase I and from new information which indicated that the 1995 reasonable and prudent alternative would not avoid jeopardizing the continued existence of the Cape Sable seaside sparrow. The operational plans associated with Phase II and their potential effects to the Cape Sable seaside sparrow were never evaluated. Due to the interdependency of the **C-111 Project** with the **Experimental Program**, the Service requested reinitiation of consultation on all three of these activities.

By letter dated November 4, 1997, the Corps agreed to reinitiate consultation on the **Modified Water Deliveries** project and the **Experimental Program**, but recommended consultation be deferred on the **C-111 Project** since operational plans were still under development.

By letter dated March 6, 1998, the Corps requested a list of information needs necessary for the Service to begin preparing the biological opinion. The Corps stressed the urgency in completing formal consultation to avoid further delay with the operation of pump S-332D; a vital component of Test 7, Phase II, for the restoration of Taylor Slough within ENP.

In a letter dated March 12, 1998, the Service provided a list of information needs considered necessary to complete the consultation on the **Modified Water Deliveries** project, the **Experimental Program**, and the **C-111 Project**. The Service informed the Corps that the **C-111 Project** is considered interrelated and interdependent to both the **Modified Water Deliveries** project and **Experimental Program** and, therefore, would need to be included in the reinitiation request and subsequent biological opinion.

By letter dated April 23, 1998, the Service acknowledged the Corps's sense of urgency for completing the biological opinion in a timely manner as expressed in the Corps's March 6, 1998, letter. Although the Service would proceed with the biological opinion based on the best information currently available, additional flexibility with the consultation time frame was requested. The Service indicated that an extension of this time frame may be appropriate if it becomes clear that crucial information would become available too late for incorporation into the first draft of this biological opinion prior to the July 31, 1998, due date. The Corps had previously requested, by letter dated March 6, 1998, the Service proceed with the consultation and use the October, 1995, Environmental Assessment on Test 7 as the biological assessment on the effects of Test 7, Phase II, including the use of S-332D. The Service indicated that upon further review of the environmental assessment for Test 7, insufficient information on the design or proposed operation of S-332D or the effects its use may have on listed species or designated critical habitats was provided. This information along with the information identified in the Service's March 12, 1998, letter were requested as soon as possible to complete the biological opinion.

On July 21, 1998, the first draft of this biological opinion was delivered to the Corps and the Corps distributed copies to interested parties.

On August 28, 1998, the Corps provided initial comments on the draft along with comments received from other interested parties as attachments. The Corps' comments of August 28, 1998, recommended the following: (1) the Service provide a second draft of the biological opinion by October 23, 1998; (2) the Corps would provide final comments by October 30, 1998; and, (3) a final biological opinion would be delivered by November 13, 1998. By letter dated September 24, 1998, the Service agreed to this schedule.

By letter dated October 22, 1998, the Corps requested delay of the schedule for issuing the second draft biological opinion until March, 1999, and the final biological opinion until April, 1999, to provide additional time to review the ecology of the Cape Sable seaside sparrow and hydrology associated with implementation of the reasonable and prudent alternative within the initial July 21, 1998, draft biological opinion.

By letter dated October 26, 1998, the Service did not concur with the Corps request for an extension indicating that: (1) no significant new information is likely to become available during the proposed extension; (2) the proposed extension would serve only to delay conclusion of this consultation well into the Cape Sable seaside sparrow's next breeding season resulting in a fourth year of jeopardy conditions; and, (3) should new significant information become available at some time in the future, consultation can be reinitiated.

Discussions with the Corps during November, 1998, resulted in modification of the time table for completion of the draft biological opinion. These discussions resulted in an agreement that the final draft biological opinion would be provided to the Corps on January 5, 1999.

The final draft biological opinion was delivered to the Corps on January 4, 1999. The Corps provided final comments on this draft by letter dated February 5, 1999.

To summarize the consultation history:

C-111 Project

* May 1994 - Service concurred with the Corps' determination of "no effect" for the snail kite, wood stork, bald eagle, eastern Indigo snake, American crocodile and Florida panther. However, the Service was unable to evaluate the effects on the Cape Sable seaside sparrow beyond construction features and, therefore, could not concur with a "no effect" determination until operational plans were developed.

Modified Water Deliveries

* February 1990 - Service issued jeopardy biological opinion with accompanying reasonable and prudent alternative to preclude jeopardy for snail kite and concluded non-jeopardy for the wood stork.

Experimental Program

* June 1994 - Serviced issued non-jeopardy biological opinion for Test Iteration 6 on the Cape Sable seaside sparrow. In addition, the Service concurred with a "no effect" determination for all other listed species by letter dated April 4, 1994 (mistakenly dated 1993).
* October 1995 - Service issued jeopardy biological opinion for Test Iteration 7 (Phase I) on the Cape Sable seaside sparrow with accompanying reasonable and prudent alternative to preclude jeopardy and concluded non-jeopardy for the wood stork. In addition, the

Service concurred with a "no effect" determination for all other listed species by letter dated September 22, 1995.

On October 17, 1997, the Service requested the Corps reinitiate consultation on the **Modified Water Deliveries** project, **Experimental Program**, and the **C-111 Project**.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Background

After major hurricanes struck southern Florida in 1947-48, producing widespread flooding, Congress authorized the C&SF Project; which utilizes levees, water storage areas, canals, gravity-flow water control structures, and large-capacity pump stations for managing water in central and southern Florida. For decades, the Corps and the SFWMD, through the operation of the C&SF Project, have manipulated the location, timing and volume of water deliveries to ENP. Over the years, since its initial completion in 1963, it has become evident that the network of canals, levees, and water control structures associated with the C&SF Project have substantially altered the natural hydrologic conditions of ENP and, concurrently, State and Federal water resource agencies have been cooperating with natural resource agencies to try to eliminate associated adverse ecological effects.

The **C-111 Project**, located in southeastern Dade County, Florida, adjacent to the eastern boundary of ENP, was authorized as an addition to the C&SF Project by the Flood Control Act of 1962. In 1970, in response to concerns from the Department of the Interior about failing ecosystems in ENP, Congress mandated a Minimum Water Delivery Schedule whereby ENP was guaranteed a minimum amount of water during each month of the year. In addition, Congress authorized modification of the **C-111 Project** for construction of the ENP-South Dade Conveyance System to provide a water supply to Dade County as well as ENP. This project included enlarging existing canals and construction of new structures and pump stations. However, it soon became apparent that the artificially-amplified flood events were as destructive as the artificial droughts.

In 1983, the NPS issued a Seven Point Plan calling for a number of measures to remedy flooding problems and restore historical flow patterns to the Everglades. Later in 1983, in response to the Seven Point Plan, Congress authorized the **Experimental Program** as part of the Supplemental Appropriations Act of 1984. This Act authorized the Corps, with the concurrence of the NPS and the SFWMD, to deviate from the minimum water delivery schedule for two years to conduct an **Experimental Program** of water deliveries to improve water conditions in ENP.

Since 1983, the **Experimental Program** has made seven tests of water management operations in an attempt to improve the ecological conditions in ENP. The first five test iterations involved

operating the structures associated with the C&SF Project in a way that delivered water from WCA 3 to both western and northeastern Shark River Slough. Iteration 6, which ended on October 31, 1995, involved improvements in water delivery to Taylor Slough while continuing the improved water deliveries to Shark River Slough that were initiated in Test Iteration 5. The current Test 7, begun on November 1, 1995, and scheduled to run for 4 years, is intended to make further improvements in Taylor Slough water deliveries.

The Everglades National Park Protection and Expansion Act of 1989 authorized the Corps to construct modifications to the C&SF Project to improve water deliveries into ENP, and to the extent practicable, take steps to restore the natural hydrological conditions within ENP. These modifications were to be based upon the findings of the **Experimental Program** authorized by the 1984 Supplemental Appropriations Act and "generally set forth" in a GDM to be prepared by the Corps entitled, "Modified Water Deliveries to Everglades National Park" (**Modified Water Deliveries**). In June 1992, the Corps issued the GDM, which proposed a modified rainfall driven schedule and certain structural modifications to the C&SF Project.

The **Experimental Program**, the **Modified Water Deliveries** project, and the **C-111 Project**, are all interrelated and are linked to the umbrella C&SF Project. Generally, the **Modified Water Deliveries** and **C-111 Project** plans identify the structural components to be built and the **Experimental Program** addresses the operational plan for water delivery via these structures and others already in place. The **Experimental Program** may also include the construction of previously authorized structural components.

The Canal 111 Project

The Corps's May, 1994, Final Integrated General Reevaluation Report on Canal 111 is incorporated here by reference. The **C-111 Project** boundary is that portion of the C&SF Project located south of and including S-331. The **C-111 Project** plans consist of the following significant structural additions to the existing C&SF Project works (Figure 2):

* Construct S-332E and Canal 111N - a spreader canal and a pump station used to improve the hydropatterns in the Southern Glades Wildlife and Environmental Area.
* Construct the L-31W and S-332D Tieback Levees - to hold water between the two levees to minimize seepage loses from ENP.
* Construct 4 pump stations (S-332A,B,C,D) - to pump water from the L-31N Canal into a detention area for later release to ENP. (*The Corps has completed the Pump Station 332D construction.)*
* Replace the bridge (SR 9336) over Taylor Slough- due to increased flows, the bridge needs modification.
* Remove spoil mounds along southernly leg of C-111 - to allow a more natural water flow to Florida Bay. (*The Corps has completed removal of the spoil mounds.*)

* Fill Canal 110 (C-110) and Canal 109 (C-109) - to stop overdrainage and establish a more natural hydropattern in the Southern Glades conservation area. (*The Corps has completed the filling of C-109.*)

The Modified Water Deliveries Project

The Corps' June, 1992, General Design Memorandum on, "Modified Water Deliveries to Everglades National Park", is incorporated here by reference. The **Modified Water Deliveries** project boundary is Shark River Slough and that portion of the C&SF Project north of S-331 to include WCA 3. The **Modified Water Deliveries** project plans consist of the following structural additions to the existing C&SF Project works (Figure 2):

* Construct Structures 345A,B,C (S-345) and Structures 349A,B,C (S-349)- to provide waterflow from WCA 3A to WCA 3B.
* Provide three breaks in the Levee 67C (L-67) and construct three canals between L-67A and C to provide conveyance for water discharged from 345A,B,C between WCA 3A and WCA 3B.
* Degrade the L-67 extension - to allow water released from WCA 3A to spread into Northeast Shark River Slough.
* Construct Structure 355 (S-355) A and B - to provide water flow from WCA 3B into Northeast Shark River Slough. (*The Corps will complete the construction of S-355A and B in early 1999.*)
* Raise Tigertail Camp - to provide flood protection for a small camp of Miccosukee Indians.
* Construct Pump Station 357 (S-357)- to pump water out of the 8.5 square mile area north through the L-31N Canal and then into Northeast Shark River Slough via new pump station 356 (S-356).
* Construct a levee and seepage collector canal around the 8.5 square mile area - to provide flood mitigation for the private residential area.

The **Modified Water Deliveries** project consists of major structural modification of, and additions to, the existing system of water control features in the central and southern Everglades that are meant to restore more natural timing, volume and placement of water flows through the action area. In general, the **Modified Water Deliveries** project attempts to reroute large volumes of water that currently pass through WCA 3A into western Shark River Slough, instead passing the water from WCA 3A to WCA 3B and then from WCA 3B to Northeast Shark River Slough.

As part of their efforts to provide technical assistance to the Corps and the Service, the NPS examined the hydrologic aspects of the **Experimental Program, Modified Water Deliveries,** and the **C-111 Project** relevant to endangered species. The report (Van Lent et al. 1999) indicates the **Modified Water Deliveries** project would be successful at passing water from WCA 3A to WCA 3B. However, some other structural components, as currently designed, are

not physically large enough to move the large volumes of water necessary to restore natural flows (Van Lent et al. 1999). Van Lent et al. (1999) also indicates the **Modified Water Deliveries** components that are designed to pass flows into Northeast Shark River Slough would have to be five times larger in order to pass peak flow volumes necessary to restore natural conditions and that the elevation of Tamiami Trail severely limits the amount of water that can be passed from WCA 3B into Northeast Shark River Slough. This results in the retention of large volumes of water in WCA 3B causing high water levels in this area, increased loss of water due to evapotranspiration, and increased loss of water due to seepage through the levee forming the eastern boundary of WCA 3B (Van Lent et al. 1999). This further results in significant reductions in the volume of water passing across Tamiami Trail into western and Northeastern Shark River Slough and Taylor Slough, producing substantially drier conditions in downstream areas of ENP as compared to current conditions (Van Lent et al. 1999).

The Experimental Program

There have been 6 previous test iterations of water delivery to ENP. The current Test 7 is described in detail in the Environmental Assessment and Finding of No Significant Impact for Test Iteration 7 of the **Experimental Program** of Water Deliveries to Everglades National Park (Corps 1995). The descriptions of the water delivery schedules and the proposed structural modifications that are found in that document are incorporated here by reference. However, we include the following summary of the major structural components and operational features of Test 7 to make it easier to follow the discussion in this biological opinion.

The purpose of Test 7 is to evaluate methods of restoring more natural hydroperiods to ecosystems within ENP, including Northeast Shark River Slough and Taylor Slough; enhance freshwater flows to Florida Bay through Taylor Slough; and reduce large, freshwater discharges through Structure 197 (S-197) into Manatee Bay and Barnes Sound (Figure 2). One objective of Test 7 carried over from previous tests is to deliver water to Northeast Shark River Slough consistent with rainfall levels. Another objective is to allow water levels in L-31W, which is upstream of Taylor Slough, to fluctuate more naturally in response to rainfall.

Test 7 would help the Corps, SFWMD, and ENP to determine the effects of a more natural water flow, resulting from rainfall, on the salinity regime of northeastern Florida Bay. Test 7 would also help determine if water loss out of the Taylor Slough area, resulting from drainage into C-111, can be reduced by holding higher water stages at Structure 18C (S-18C).

The major constraint on Test 7, like the tests before it, is the concern for flooding of private lands adjacent to ENP (Figure 2). During storm events, flood control criteria override normal operations established for the test. Other constraints include ecological concerns and structural limitations for water levels in the WCAs.

The objectives of Test 7 would be achieved through a program of water deliveries to ENP through Shark River Slough and Taylor Slough. The goal of Test 7 is to deliver 45 percent of the

total water deliveries to Shark River Slough through Structures 12 (S-12) A, B, C, and D and 55 percent of the total through Structure 333 (S-333) (deliveries through the S-12 structures are to western Shark River Slough; deliveries through S-333 are to Northeast Shark River Slough). If S-333 is closed or discharging less than 28 percent of computed flows, the guidelines for the **Experimental Program** allow and, in some instances require, the S-12 structures to discharge between 73 and 100 percent of the computed flows from WCA 3A. The constraint on the use of S-333 involves flowing water over private lands and the Tamiami Trail roadbed.

Test 7 includes the following structural modifications and operational features to be implemented in two phases:

Structural Modifications

1) Degrade the berm on the west side of the L-31W canal.
2) Plug the L-31W canal south of Structure 175 (S-175).
3) Plug the east/west-aligned, south of S-175, Aerojet Canal.
4) Install two auxiliary pumps (50 and 75 cfs capacities) at Structures 173/331 (S-173/331).
5) Construct S-332D as authorized by the **C-111 Project** *(The Corps has completed construction of S-332D, but has not begun operation).*

Operational Features

1) Water deliveries to Northeast Shark River Slough through the S-12 and S-333 structures will continue, without change, as they have since Test 5.
2) Water deliveries to Taylor Slough would be changed by increasing stages in the L-31W canal (between Structure 174 {S-174} and S-175). This would allow the L-31W canal to serve as a spreader canal that would recharge the adjacent marsh in Taylor Slough through overbank flow and reduce seepage losses, depending on canal stages. The area between the L-31W Canal and C-111 (the area known as the Frog Pond) has been placed in public ownership.
3) Implement the Rainfall-Stage operating criteria for the L-31W canal (Taylor Slough) to reflect more natural water level fluctuations.
4) Abandon the S-332 and S-175 structures as water delivery points to ENP and minimize their future operation for flood control.
5) Change the operational levels at S-176 to open at 5.2 feet and close at 5.0 feet.
6) Change the operational levels at S-174/S-332D to open at 5.0 feet and close at 4.8 feet.

There are two phases to Test 7. Phase I is ongoing and includes capping the water levels in the L-31W Canal at 4.7 feet, ensuring that levels do not fall below 3 feet, and modifying S-332 to pump up to 495 cfs of water into Taylor Slough. In addition, a new pump station, S-332D, was constructed in vicinity of S-174. During Phase II, the cap on stages in the L-31W Canal would be eliminated, the canal would be plugged in several places south of S-175, the western berm of that levee north of S-332 would be degraded, and pumping at S-332 would be minimized, which

would allow stages in the canal to approximate surface water levels. Also during Phase II, pump S-332D would be used to move excess flood water through the L-31W Canal.

The berm on the west side of the L-31W canal is immediately adjacent to the eastern edge of Cape Sable seaside sparrow subpopulation C habitat, and sparrow breeding activity has been observed in this vicinity as recently as 1997 (Figure 3). The L-31W canal south of S-175 (where a plug is to be installed) is more than 1 mile away from the closest Cape Sable seaside sparrow habitat (subpopulation C). The Aerojet Canal (where a plug is to be installed) is immediately adjacent to the northern edge of Cape Sable seaside sparrow subpopulation D, and sparrow breeding activity has been observed in this vicinity as recently as 1997 (Figure 3).

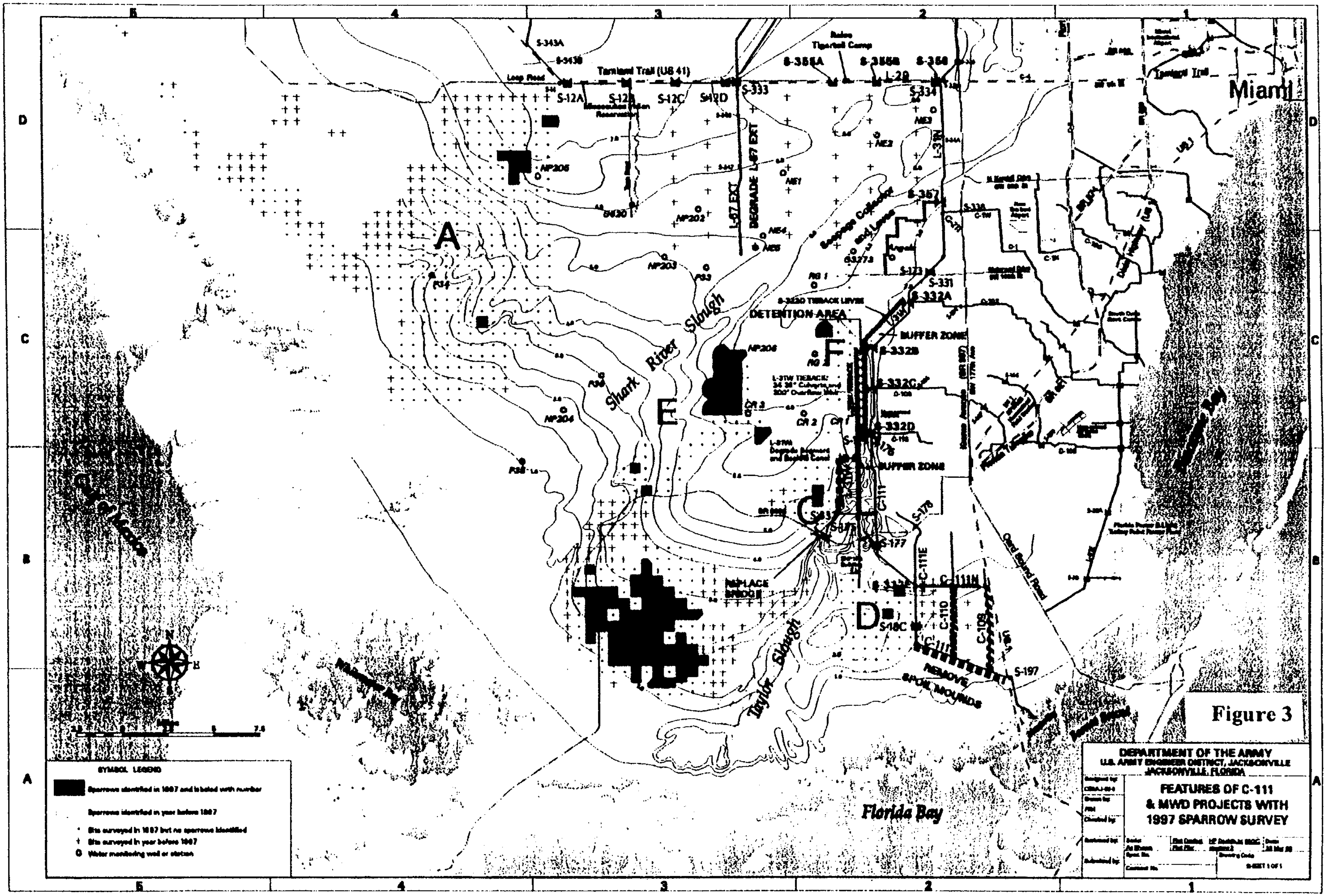
Figure 3
DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, JACKSONVILLE
JACKSONVILLE, FLORIDA
FEATURES OF C-111
& MWD PROJECTS WITH
1997 SPARROW SURVEY
SYMBOL LEGEND
Sparrows identified in 1997 and labeled with number
Sparrows identified in year before 1997
Site surveyed in 1997 but no sparrows identified
Site surveyed in year before 1997
Water monitoring well or station
Miami
Tamiami Trail (US 41)
Tamiami Trail
Loop Road
S-343A
S-12A
S-12B
S-12C
S-12D
S-333
S-334
S-355A
S-355B
S-356
L-29
L-31N
L-67 EXT
DEGRADE L-67 EXT
S-357
Seepage Collector and Levee
S-331
S-332A
S-332B
S-332C
S-332D
DETENTION AREA
BUFFER ZONE
Shark River Slough
Taylor Slough
Florida Bay
REMOVE SPOIL MOUNDS
REPLACE BRIDGE
S-18C
C-111
C-111E
C-111N
C-110
C-109
S-175
S-177
S-178
S-197
Card Sound Road
US 1
NP205
NP202
NP203
NP204
NP206
NE1
NE2
NE3
NE4
NE5
R3 1
R3 2
CR 2
CR 3
A
C
D
E
F

Conservation Measures

Construction Monitoring Plan

Through recent discussions with the Service, the Corps has agreed to incorporate the following provisions for endangered species monitoring in association with construction activities (Construction Monitoring Plan) into all three proposed actions.

1. Monitoring for Wood Storks, Snail Kites and Cape Sable Seaside Sparrows

For construction activities involving heavy, earth-moving equipment, sustained noise levels that make conversation difficult, blasting, or other activities having similar general disturbance potential occurring near wood stork, snail kite or Cape Sable seaside sparrow nesting habitat:

a. construction will be conducted outside the species' breeding season; or,
b. trained observers will survey the site beginning one month before construction is to begin, and then every two weeks thereafter, within 0.5 mile (for wood storks and snail kites) or 0.25 mile (for Cape Sable seaside sparrows) of the site of construction activity. If any breeding activity is detected, all work will cease, and an intensive survey of the site will be conducted to assess the specific location, density and stage of breeding activity. Upon completion of this survey, a meeting will be convened between the appropriate staff of the Service, Corps, ENP, SFWMD and the Florida Game and Freshwater Fish Commission (GFC). Survey results will be reviewed, and, based on available information, a decision will be made on whether to continue construction at the site, with potential restrictions, or cease construction activities within the area, until nesting is completed.
c. surveys should begin before construction crews are mobilized so as to minimize cost of delays.

2. Monitoring for Eastern Indigo Snakes

a. the Corps shall coordinate with the Service's South Florida Field Office during the establishment and implementation of an eastern indigo snake protection/education plan.
b. a trained observer shall be present on site to watch for eastern indigo snakes during all initial construction and clearing phases of the project. If the observer determines that no further disturbance of eastern indigo snakes is likely for the remainder of an individual construction project, then the observer's presence will no longer be required for the remainder of that construction project. However, in the event that disturbance to an eastern indigo snake does occur after the observer has departed, observation will again be required. The name(s) and qualifications of the proposed observer shall be submitted to the Service for review and approval. The information submitted for approval should indicate what

experience the individual has that would qualify them to act as an eastern indigo snake observer.

c. an eastern indigo snake protection/education plan shall be developed for all construction crews to follow. The educational materials for the plan could consist of a combination of posters or videos, pamphlets, and lectures and should include the following information:

1. a description of the eastern indigo snake, its habits, and protection under Federal Law;
2. instructions not to injure, harm, harass or kill this species;
3. directions to notify the qualified observer(s) if an eastern indigo snake is sighted;
4. directions to cease construction activity, notify the qualified observer, and allow the eastern indigo snake sufficient time to move away from the site on its own, or have the observer move the snake out of harm's way, before resuming construction (only a qualified individual, who has either been authorized by a section 10(a)(1)(A) permit issued by the Service or has been designated as an agent of the State of Florida by the GFC for such activities, is permitted to come in contact with an eastern indigo snake); and
5. telephone numbers of pertinent agencies to be contacted if a dead eastern indigo snake is encountered.

d. the qualified observer should examine any possible eastern indigo snake burrows in the construction area. If a burrow is found to contain an eastern indigo snake, the burrow should be carefully excavated until the snake leaves the area or until it can be moved out of harm's way by the qualified observer.

e. a monitoring report summarizing all activities pertaining to the eastern indigo snake must be submitted to the South Florida Field Office within 60 days of the conclusion of clearing and construction phases and following maintenance activities that may occur. The report should contain the following information:

1. any sightings of eastern indigo snakes; and,
2. summaries of any relocated snakes (e.g., locations of where and when they were found and relocated).

These monitoring provisions are designed to reduce or eliminate any disturbance to breeding activities of listed species that occur due to construction activities near breeding sites. They will also minimize costly construction delays. The Service commends the Corps for this proactive approach to reducing possible adverse effects to listed species.

Action Area

For the purposes of this consultation, the action area includes the boundaries of Big Cypress National Preserve south of S-344, ENP, WCA 3 (units A and B), the area known as the Frog Pond, the area known as the 8.5-square mile area, Florida Bay, and Barnes Sound (Figure 1). This area encompasses those lands and waters that would be directly and indirectly affected by water delivery, regulation, and flood control; and also includes those lands and waters supporting populations of threatened and endangered species, and their designated critical habitat, likely to be directly or indirectly affected by the proposed action.

STATUS OF THE SPECIES/CRITICAL HABITAT

This section presents the biological and ecological information relevant to formulating the biological opinion. Appropriate information on the species' life history, habitat and distribution, and other factors necessary for survival are included. This analysis documents the effects of all past human and natural activities or events that have led to the current status of the species. When the Service's review focuses on the effects of the action on a discrete recovery unit or designated critical habitat unit, this section describes the status of that unit and its significance to the species as listed or to the designated critical habitat.

During preparation of this biological opinion, the Corps and others raised several questions regarding the biological information on the Cape Sable seaside sparrow and hydrological information presented in Van Lent *et al.* (1999) used in this analysis. The Service has reviewed all available data regarding the biology of the Cape Sable seaside sparrow and the hydrology of the action area. Further, the Service has reviewed some peer review of the Service's conclusions drawn from the currently available data, including the peer review cited by the Corps. To the extent that such peer review is available, it has been considered and discussed as appropriate. Taking all of this into careful consideration, the Service has determined that the biological information regarding the Cape Sable seaside sparrow cited in this biological opinion is the best such information currently available.

The Service has also carefully considered the substantive questions that have been raised by the Corps and others concerning the Van Lent *et al.* (1999) modeling, and if future modeling is developed that is agreeable to both the Corps and the Service, the Service would likely consider that to be new information that may warrant a reexamination of this biological opinion. However, until such new modeling is developed, the Service has determined that the Van Lent *et al.* (1999) modeling is part of the best scientific information currently available because it is the only published, peer reviewed, modeling information of a sufficiently detailed nature to make the required determinations and because the questions raised by the Corps and others are based on professional differences of opinion rather than findings of factual error. Also, we would like to point out that the finding of jeopardy for the Cape Sable seaside sparrow and the reasonable and prudent alternative are based on actual observed field information cited by Van Lent *et al.*